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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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EXAMINER

GARRETT, D

ART UNIT

PAPER NUMBER

1774

DATE MAILED:

09/10/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

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Office Action Summary

Application No.

09/489,144

Applicant(s)

Hu et al.

Examiner

Dawn Garrett

Art Unit

1774

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 7-25-01
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above, claim(s) 38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-37 and 39-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 2 20) ☐ Other:

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DETAILED ACTION

Response to Amendment

1. This office action is in response to applicant's amendment, paper no. 4, mailed July 25, 2001 wherein applicant amended the specification and claim 34, added claims 42 and 43, elected the following with traverse:

(a) one selected A group - selected was a multivalent aromatic group with contains at least two fused aromatic rings.

(b) one selected Ar¹ group - selected was phenyl

(c) one selected Ar² group - selected was phenyl

Also, applicant's selection of ultimate species compound II-1, which is 2,4,6-tris-(4-biphenyl)-1,3,5-triazine, is acknowledged.

2. The claims which read on the elected species are claims 1-37 and 39-43. Claim 38 is withdrawn from consideration as a nonelected claim.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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4. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 12 it is unclear what component contains or what variable is "a biphenyl, a naphthyl, or a terphenyl" as recited in line 2 of claim 12. Clarification is required.

5. Claims 36 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In the seventh line of claim 36, the phrase "wherein said low is" is indefinite. It is unclear to what component the word "low" refers.

6. Claims 29, 30, 36, and 37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is not clear how the buffer layer tertiary aromatic amine differs from the separate hole transport layer which may also comprise tertiary aromatic amine. Clarification is required.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-21, 25-28, 31-35, and 39-43 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 98/04007 to Bosch.

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Bosch teaches an electroluminescent device comprising triazine compounds as an electron-conducting layer (see abstract). The layers of the electroluminescent device depicted on the front page of WO 98/04007 are the following:

- 1) substrate
- 2) anode
- 3) hole injection layer
- 4) hole conducting layer
- 5) light emitting layer
- 6) electron conducting layer
- 7) electron injecting layer
- 8) cathode
- 9) encapsulation protective covering (see description of drawings page 9)

With regard to instant Formula (I) and applicant's election of 2,4,6-tris-(4-biphenyl)-1,3,5-triazine as an ultimate species, Bosch describes triazines according to the instant formula (see page 3 through 6) as an electron conducting layer. With regard to claims 7 and 16, it is noted that L, R', and R'' are not required. With regard to claims 18 and 19, it is noted that the buffer layer is optional. Alq₃ is taught as light emitting material per instant claim 21 (see page 9, last line).

The Bosch anode is composed of ITO and the cathode is comprised of aluminum (see last line of page 7 through top of page 8) per instant claims 27, 28, 32, and 33. Bosch discloses all

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limitations of claims 1-21, 25-28, 31-35, and 39-43. The reference is therefore deemed to anticipate these claims.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 29, 30, 36, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bosch (WO 98/04007).

Bosch discloses all layers of claims 29, 30, 36, and 37 as discussed in the above paragraph. Bosch exemplifies an anode of 80 nm thickness, a tertiary aromatic amine layer of 80 nm (per the instant buffer layer), and a triazine layer of 30nm (see pages 9 through 10, example 1). It is not seen where the thickness of the cathode comprised of aluminum is disclosed by Bosch. Thickness is considered a result-effective variable. It would have been obvious to one of ordinary skill in the art to have determined a thickness for the cathode with a reasonable expectation of success, because other layers taught by Bosch are formed within the thickness range of 30 to 80 nm. A prima facie case of obviousness may be rebutted where the results of the optimizing variable, which is known to be result-effective, are unexpectedly good. *In re Boesch and Slaney*, 205 USPQ 215.

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11. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bosch in view of Mori (U.S. Patent No. 6,215,245). Bosch is relied upon as set forth above. Bosch describes the use of a light emitting layer such as Alq_3 in the electroluminescent device, but fails to disclose the light emitting layer may further comprise a fluorescent dye. Mori teaches, in analogous art, the use of a mixture of complex dyes such as coumarin, quinacridone, or rubrene in combination with Alq_3 for a layer capable of emitting light (see Mori col. 7, lines 45-54). Because of the success in combining a dye dopant with Alq_3 in a light emitting layer demonstrated by Mori, one of ordinary skill in the art would have been motivated to have used a dye dopant to enhance the light emitting ability of the Alq_3 light emitting layer taught by Bosch. Mori fails to disclose the ratio of dye dopant to Alq_3 , however, the ratio of dye to host material is considered a result-effective relationship depending on the desired level of light emitted. It would have been obvious to one of ordinary skill in the art at the time of the invention to have determined the ratio of dopant and host material, because the ratio is a result-effective variable. It is noted that a prima facie case of obviousness may be rebutted where the results of the optimizing variable, which is known to be result-effective, are unexpectedly good. *In re Boesch and Slaney*, 205 USPQ 215.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. These references are considered cumulative to or less material than those discussed above.

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13. Applicant is reminded that any evidence to be presented in accordance with 37 C.F.R. § 1.131 or 1.132 should be presented prior to final rejection in order to be considered timely.

14. Should you have any questions concerning this communication, please direct them to Dawn Garrett at 703-305-0788. The examiner can be reached at this number from 9:00 am to 5:30 pm E.S.T. Monday-Friday. If attempts to reach the examiner by telephone prove unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached at 703-308-0449. Please allow the examiner twenty-four hours to return your call.

A facsimile center has been established for Group 1700 on the 8th floor of Crystal Plaza

3. The hours of operation are Monday through Friday, 8:45 am to 4:45 pm. The fax numbers for Art Unit 1700 are 703-305-3599 for official after-final faxes, and 703-305-5408 for all other official faxes. Use of the Group 1700 center will facilitate rapid delivery of materials to examiners in Art Unit 1774.

Any inquiry of a general nature, or those relating to the status of this application should be directed to the group receptionist whose telephone number is 703-308-2351.

CYNTHIA H. KELLY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700


D.G.

September 5, 2001

